

2) INTEGRATION OF EXPONENTIAL FUNCTIONS

$$\text{RULE: } \int e^{f(x)} dx = \frac{1}{f'(x)} \cdot e^{f(x)} + c$$

$$\int a \cdot e^{f(x)} dx = a \cdot \frac{1}{f'(x)} \cdot e^{f(x)} + c$$

$$\text{e.g. } \int e^{ax+b} dx = \frac{1}{a} \cdot e^{ax+b} + c$$

Examples: Integrate these functions.

$$1) \int e^{3x} dx = \frac{1}{3} e^{3x} + c$$

$$2) \int e^{2x+5} dx = \frac{1}{2} e^{2x+5} + c$$

$$3) \int 3 e^{4x-7} dx = 3 \int e^{4x-7} dx = 3 \cdot \frac{1}{4} e^{4x-7} + c = \frac{3}{4} e^{4x-7} + c$$

$$4) \int 2 e^{x/3} dx = 2 \int e^{x/3} dx = 2 \cdot \frac{1}{1/3} e^{x/3} + c = 6 e^{x/3} + c$$

$$\begin{aligned} 5) \int \frac{2}{3e^{4x}} dx &= \int \frac{2}{3} \cdot \frac{1}{e^{4x}} dx = \frac{2}{3} \int e^{-4x} dx = \frac{2}{3} \cdot \frac{1}{-4} \cdot e^{-4x} + c = \frac{-1}{6} e^{-4x} + c \\ &= \frac{-1}{6e^{4x}} + c \end{aligned}$$

Delta Ex 16.4 pg 163, Q1 – 25 (odd numbers)